VOLAMP

CAMLINX II - *Lite*

User Manual

Important

Powering up the Camlinx II

The CamlinxII system takes up to 60 seconds to power up.

During this time, video and audio passed by the system is unreliable and should be ignored.

Disclaimer

All information contained in this manual is believed to be accurate and reliable. However, Volamp Ltd assumes no responsibility for its use. Since conditions of product use are outside our control, we make no warranties express or implied in relation thereto. We therefore cannot accept any liability in connection with any use of this information.

This product is not intended for use in life support appliances, devices or systems where a malfunction of the product can reasonably be expected to result in personal injury. Use of any Volamp product in such applications is expressly prohibited.

Whilst every effort has been made to ensure that this document is correct, errors can occur. If you find any errors or omissions please let us know, so that we can put them right

Laser Safety

Invisible laser radiation. Class 1 lasers are used in this product for fibre optic communications. The wavelength used is in the infra-red band so the light emitted cannot be seen. Although the levels are low and are classified as safe under all conditions of normal use, we recommend that users avoid looking directly into the beam.

Trademarks

Camlinx II is a trade mark of Volamp Limited.

Opticalcon ® is a registered mark of Neutrik AG

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1. Introduction

Camlinx II Lite is a camera back system for multiplexing video, audio, talkback and control signals onto fibre-optic cables for transmission between a camera and a production facility. This provides the following benefits;

Greatly increased transmission distance over copper based cable

increased bandwidth / data rates

reduced cable thickness/bulk

reduced susceptibility to EM interference

Systems can be ordered with support for all common connection systems including Neutrik and Lemo. Fibre inputs to the units use the LC connection system.

A system comprises of a Base unit which resides in the production area and a Head unit which can be mounted either on the camera (with appropriate battery mounting plates), or close to the camera. The head and the base units in the Camlinx II Lite system are identical.

The two units are connected by a fibre optic cable containing two fibres. Power can be supplied to the head via a hybrid fibre cable (incorporates copper conductors as well as the fibres), battery or a local 12V DC supply.

The system has a USB based upgrade facility which allows users to upgrade their systems in the field from a USB stick . This feature allows the user to incorporate new features and enhancements quickly and reliably.

Settings on the base and head units can be adjusted using three position switches mounted on the front of the units. These switches can be moved from left to right and also have a centre push position. When using these switches the user must press and hold the switch in the desired position until he sees the setting change on the display.

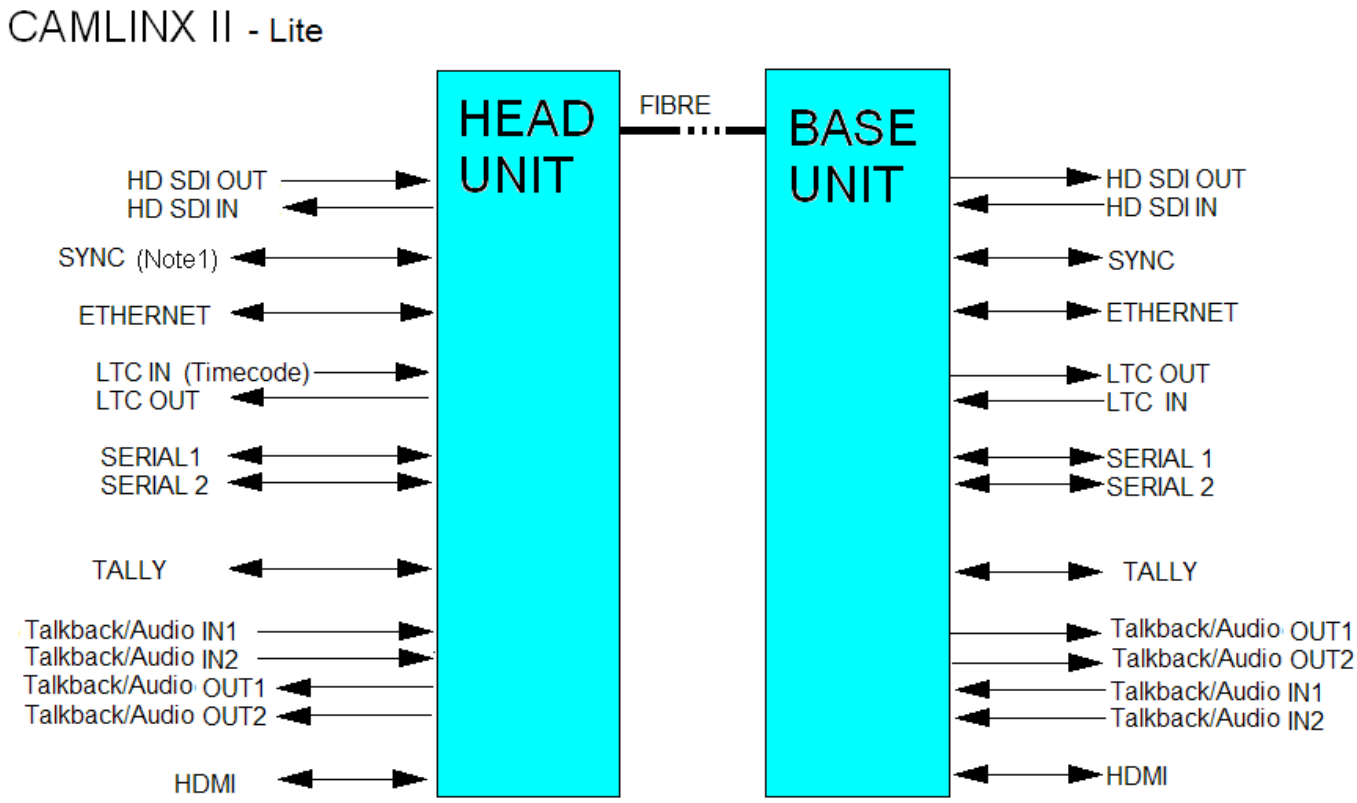
Both the head and the base have a 2 x 16 character display used to adjust overall system settings.

There are three systems in the Camlinx II range of fibre systems. These are ;

1. Camlinx II — High end system with optional support for 3G applications.
2. Camlinx II Lite — Mid range system
3. Camlinx II Zero — Low end system for applications not requiring audio.

See website for further details.

1.1. Block Diagram



Notes:
1. Sync Format - Bi-level and Tri-level (Hi-def) syncs. are supported
2. Talkback available on Audio channels.

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2. Enclosure

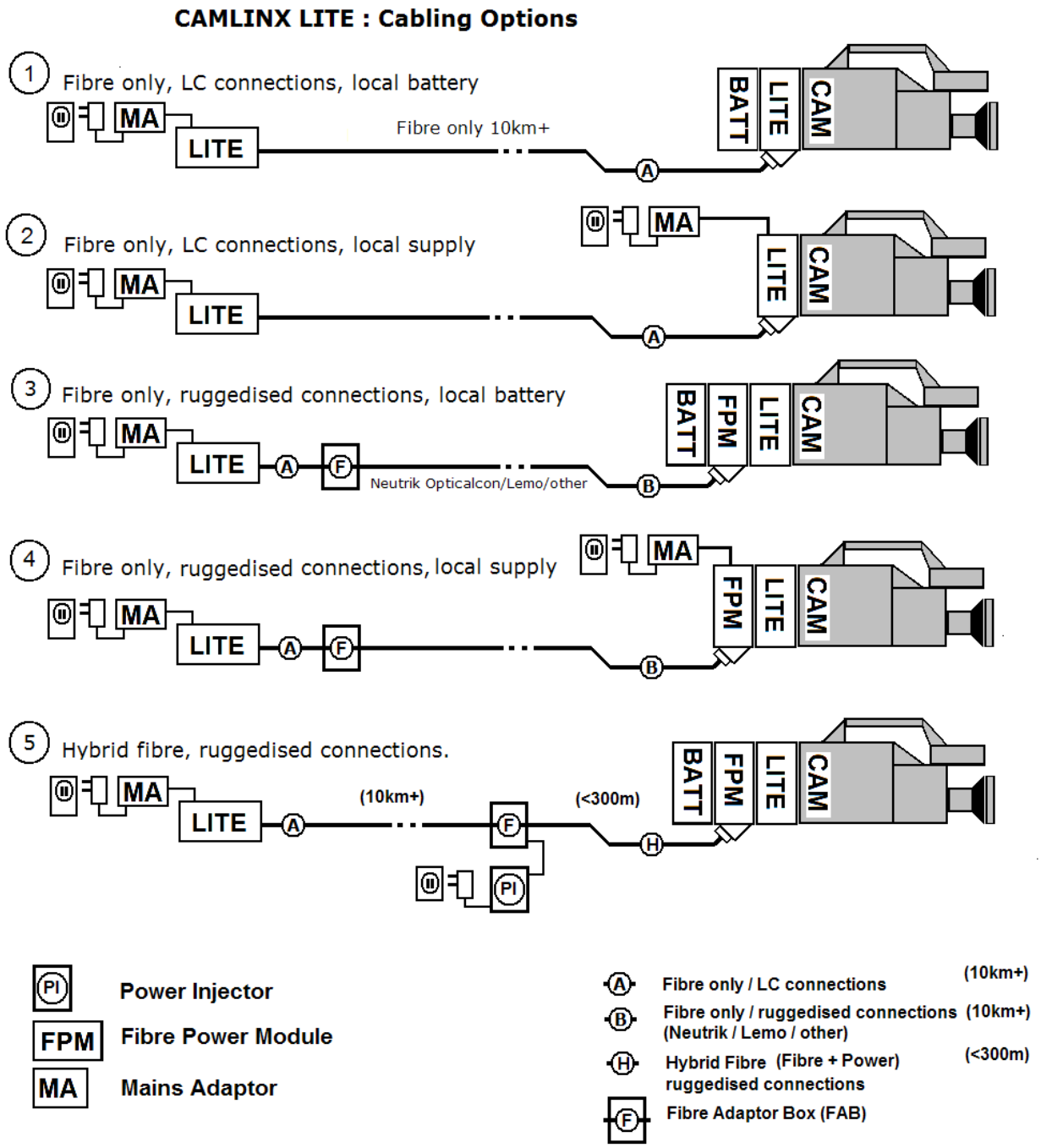
2.1. Head and Base Units

2.2. Dimensions and Weights

	Dimensions Width x Depth x Height (mm)	Weight (kg)
Unit	180 x 140 x 40 (4M wide, 2 per 1U rack)	??
Unit + FPM*	xxx x xxx x xx ()	??

*FPM – Fibre and Power Module attachment for the head, see accessories.

3. Configurations



The standard Camlinx 2 system is designed to use 9 µm single mode fibre and will not work with multi-mode cable. Single mode fibres permit cable lengths of several kilometres.

The system will not operate through fibre optic switching equipment such as Ethernet hubs, SMPTE video switches, etc.

4. Quick start guide

1. Make system connections according to chosen system configuration. Ensure all cables are connected to the system.
2. Turn on mains power to the base. Ensure power is present at the head and the base. Note that the head powers up several seconds later than the base to reduce power inrush loading on initial power on.
3. Check fibre levels using the LED display at head or base.
4. Set camera number using the menus on the base.
5. Set the serial communications standard (RS232 by default). If a remote control panel is used, check its operation.
6. Set the head programme audio options using the LCD - Line level by default.
7. Set the head headphone microphone input options using the LCD - mic level by default. Adjust the headphone volume level.
8. Enable phantom power to the headphones as required using the LCD.
9. System should be operational.

5. Features

5.1. Video

The following video standards are supported;

Video Standard	SMPTE	Supported
Composite NTSC/PAL/SECAM	170M	Yes
SD-SDI 270MBit PAL	259M	Yes
SD-SDI 270MBit NTSC	259M	Yes
HD-SDI 1485MBit 1080 50i, 25p, 60i, 30p, 24p	292M	Yes
HD-SDI 1483MBit 1080 59.9i, 29.9p, 23.9p	292M	Yes
HD-SDI 1485MBit 720 60p	292M	Yes
Ethernet		10/100Mb/s
HDMI		Yes

5.2. Programme Audio / Talkback

Audio connectors are present on the head and base allowing the system to pass audio without additional hardware. Audio input levels can be adjusted in +6dB increments using the thumb wheel switches on the front of the panel and the LCD. This allows the system to accommodate microphone and programme audio level inputs.

A 5 pin talkback / headphones connector plugs directly into either of the audio connectors. Audio or talkback inputs on 3 pin XLR are supported using the Camlinx Lite Audio cable (section 7.1) to make the connection. If talkback is used, then a single audio channel is still available for a microphone input.

Embedded audio is passed transparently by the Camlinx II system.

5.3. Displays

Each Camlinx Lite unit has a 2 x 16 character LCD display which is used with the two three position switches to adjust system settings.

5.4. Thumb wheel Switches

Settings on the Base and Head units are adjusted using two thumb wheel switches (SW1,SW2). These have three positions which are to the left, to the right and centre push. **When using these switches the user must press and hold the switch in the desired position until the LCD display changes.**

5.5. USB System Updates

The system has a USB upgrade facility which allows users to upgrade their systems in the field from a USB stick.

System upgrade files are available by;

a) USB stick from Volamp or Volamp Distribution

b) Email attachment from Volamp or Volamp Distribution

c) File download from the website.

To upgrade a unit, files must be loaded onto a USB stick. Apply power to the head or base unit and allow it boot up as normal. Insert the USB stick and leave the system for 5 minutes. During this time the system will not pass signals. Once the system has reconfigured it will automatically reboot itself and start to pass signals. Remove the USB stick.

Volamp recommend the use of SANDISK USB sticks for this purpose.

5.6. Battery Mounting Plate

Head units can be supplied with camera battery mounting plates which enable the head units to be mounted on the camera back. The required battery mounting plate should be specified when ordering. The following plates are supported;

1. Anton Bauer

2. Sony V-Lok

3. PAG PagLok

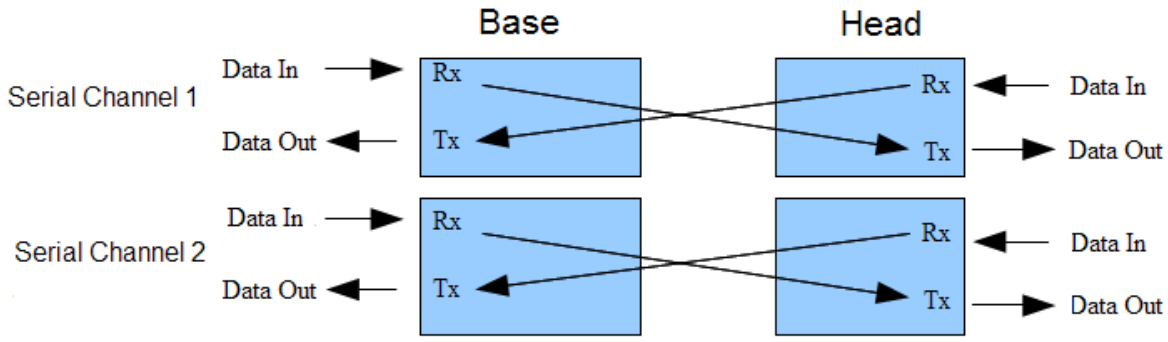
5.7. Tri-Level / Bi-Level sync

The sync inputs on the head and base allow the system to be locked to a studio reference signal (genlock).
The inputs to head and base are bi-directional, if a sync source is connected to the base sync connector, the head sync connector will automatically be configured as an output which can be used at the camera. Alternatively, if the sync source is connected to the head, the base will configure the sync connector as an output.
Both bi-level (SD) and tri-level (HD) syncs are supported.

5.8. Serial Data

The system provides two full-duplex serial channels with a maximum data rate of 500KBit/second. Both channels can be configured as RS232 or RS422 using the menus on the base. Please contact Volamp if support for RS485 is required.

Serial channels 1&2 have dedicated connectors on the base and head units.
Note the crossover of the serial signals between the head and the base.



5.9. Timecode

The system passes Time Code (LTC) between the head and the base.

Frequency of operation 960hz – 2.4 kHz.

24,25 or 30 frames of timecode per second with 80 bits per frame.

5.10. Ethernet

110/100 Ethernet can be passed transparently between the head and the base. RJ45 connectors are present on both units for this purpose. This facility can be used for;

Computer networking

Camera control

Pan and tilt control

Internet access.

5.11. Power over Ethernet

Additional external hardware is required for this feature.

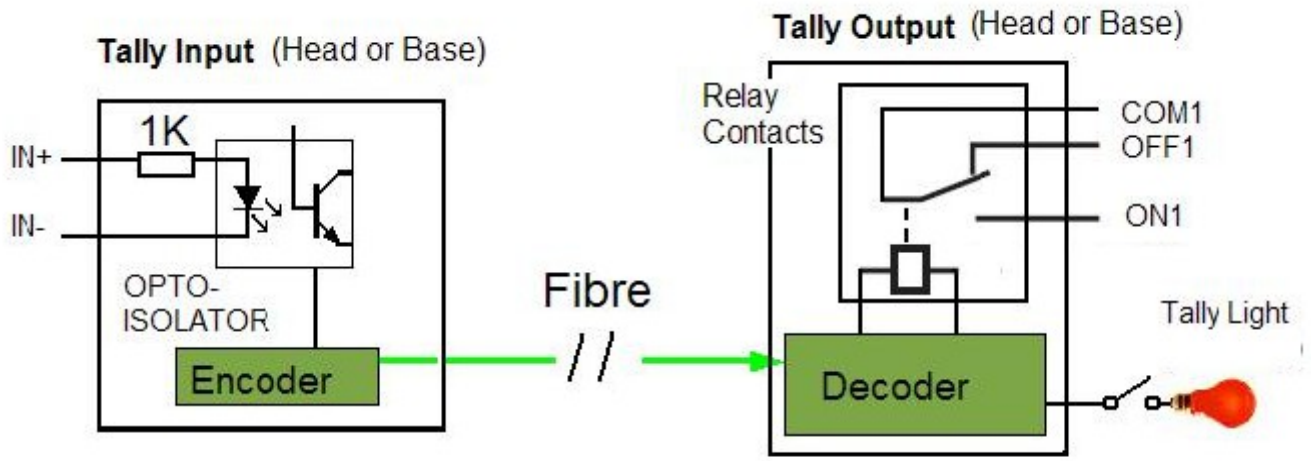
5.12. HDMI

HDMI outputs are present on the both head and base.

The HD-SDI input video channel at the head is output on the HDMI connector at the base. The HD-SDI input video channel at the base is output on the HDMI connector at the head.

5.13. Tally

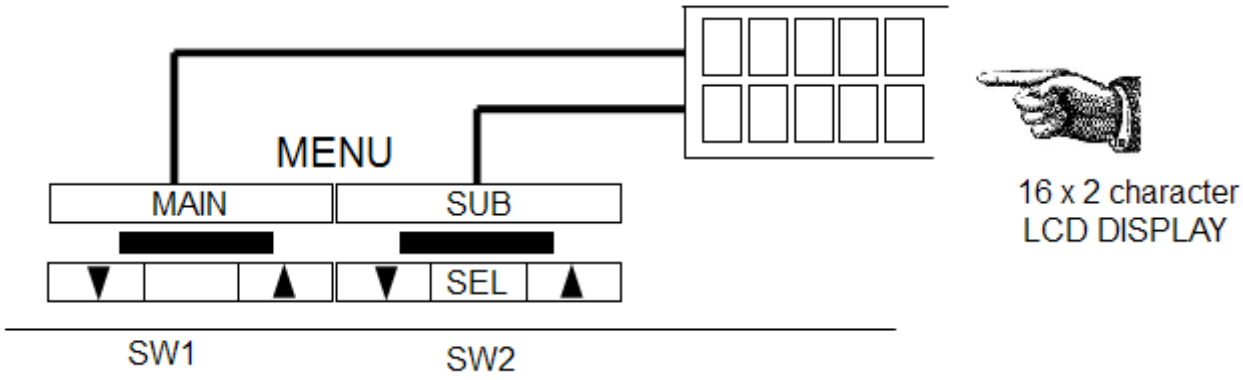
The system incorporates a bidirectional Tally system used to provide an on-air indication at either the head or the base. 9 way D-type connectors present on the head and base units with the tally connections. Each unit has a dedicated Tally LED indication on the top of the unit which incorporates a push-button switch so it can be manually disabled.



6. System Settings

6.1. Settings adjustment

The base and head units have a 16x2 character LCD which is used when adjusting system settings.



Head and Base Switches and LCD display

The left switch (SW1) navigates up and down through the **main menu** options while the right switch (SW2) navigates through the **sub menu** options.
System settings and system information are accessed via these switches.

Once the correct sub menu has been selected, the user must press and hold the centre button on SW2 until (→) appears. The sub menu can then be adjusted with SW2. To confirm the setting, press and hold the centre button of SW2 until (→) disappears.

The following table lists the options available using the LCD.

	Main Menu Options		Sub Menu Options		SELECT - >	INFO
	SWITCH 1		SWITCH 2			
option	(NOTE 1)	option	(NOTE 2)	option	(NOTE 3)	(NOTE 4)
1	CAMLINXII	1	FPGA Head Temp.			55^C
	BASE	2	FPGA Base Temp.			56^C
		3	PCB Issue No.			1
		4	Unit ID			0475ae
		5	Software			2660
		6	Firmware			N/A
		7	Start Temp			40^C
2	AUDIO	1	Left	1	Line	
		2	Right	2	Mic	
3	COMP CH2 SET			1	Enabled	
				2	Disabled	
4	STD	1	STD SDI Output			Standard of the selected
		2	STD CVBS Input 1			video channel.
		3	STD CVBS Input 2			
		4	STD SDI Input			
		5	STD CVBS Output			
5	CAMERA NUMBER			1	1	
				2	2	
				3	3	
				4	4	
				5	5	
6	TALLY OUTPUT	1	Local	1	LOCK ON	
		2	LED	2	LOCK OFF	
		3	Remote	3	STD	
				4	INV	
7	SERIAL RX TX	1	CH1	1	RS232	
		2	CH2	2	RS422	
		3	CH3			
8	FIBRE		Local			DRIVER (SFP) Temp
			3G1			Fibre Loading
			3G2			Status
			Remote			
NOTES						
1	Push left or right to scroll up/down the Main Menu options listed below					
2	Push left or right to scroll up/down the Sub Menu options.					
3	Press and hold the centre button of Thumbwheel2 (right hand side) until the (- >) appears.					
	Change the setting by pressing Thumbwheel 2 to the right or left.					
	To confirm the setting, press and hold centre button of Thumbwheel2 until (- >) disappears.					
4	These submenu settings display the system information listed below.					

6.2. Head Unit : Settings adjustment

The two 3 position rocker switches on the head adjust Audio and Talkback functions. **When using these switches the user must press and hold the switch in the desired position until the LCD display changes.**

Setting	**Function Select Box displays**	
GAIN IN	5	Line level input 0 – 5 Increments of 6dB (0dB to 30dB range)
Ph+	P	Phantom Power enabled
VOLUME		Increase / decrease headphone volume
Mono	S	Individual channels to each earphone (Stereo)
	M	Both talkback channels mixed to ear earphone (Mono)
MIC LEVEL	5	MIC level input 0 – 5 Increments of 6dB (0dB to 30dB range)
Mute	M	Microphone mute / unmute.

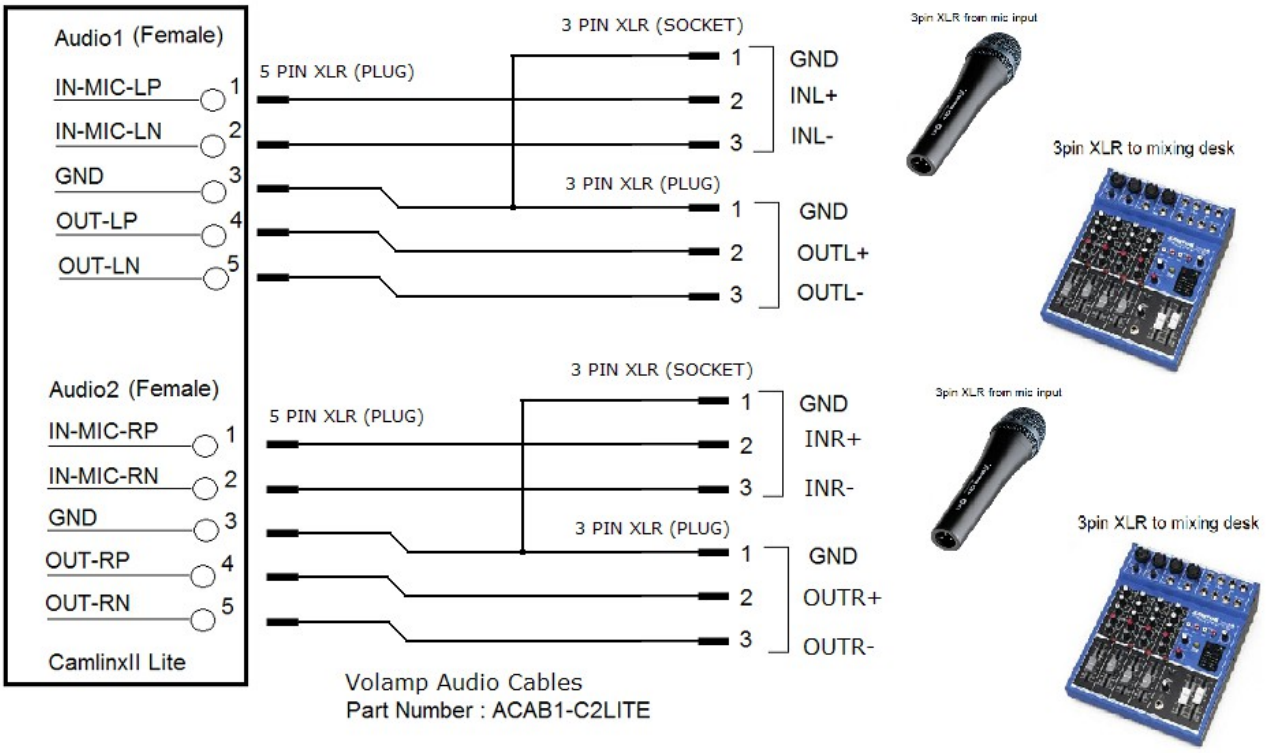
7. Connectors

7.1. Programme Audio

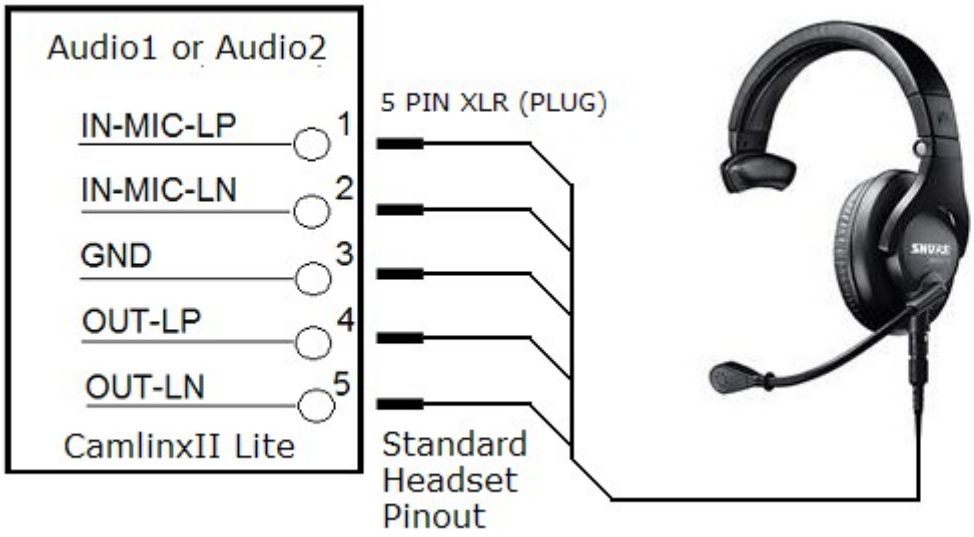
The audio connectors are female 5 pin XLR with the following pin-out;

	Connector		
Pin	**Audio1**	**Audio2**	
1	IN-MIC-LP	IN-MIC-RP	
2	IN-MIC-LN	IN-MIC-RN	
3	GND	GND	
4	OUT-LP	OUT-RP	
5	OUT-LN	OUT-RN	

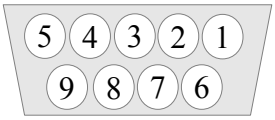
Connector type	**Mating half**
Neutrik 5 pin XLR : NC5FBH	Neutrik NC5MXX



7.2. Talkback Audio - headset connection



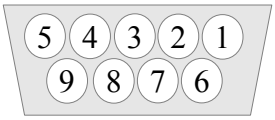
7.3. Serial 1 & 2 connector pin assignments. (9 pin D Type)



Pin	Function	Pin	Function
1	0V	**6**	NC
2	TX+ (RS232 / RS422)	**7**	TX- (RS422 only)
3	RX+ (RS232 / RS422)	**8**	RX- (RS422 only)
4	12V (200mA max)	**9**	NC
5	GND		

Connector type	Mating half
HARTING - 09 64 113 7802 FEC 1779283	ITW MCMURDO - SDE9PTD FEC 150726

7.4. Tally (9 pin D Type)



Pin	Function	Pin	Function
1	AUX 0V	**6**	NC
2	Tally - ON1	**7**	Tally - OFF1
3	Tally - IN+	**8**	Tally - IN-
4	12V (200mA max)	**9**	Tally - COM1
5	DGND		

Connector type	Mating half
HARTING - 09 64 113 7802 FEC 1779283	ITW MCMURDO - SDE9PTD FEC 150726

7.5. +12V local power connector.

Connector type	Mating half
DC-016A 2.1mm DC Socket	DCP-015 (2.1mm Plug with locking ring)

8. Power

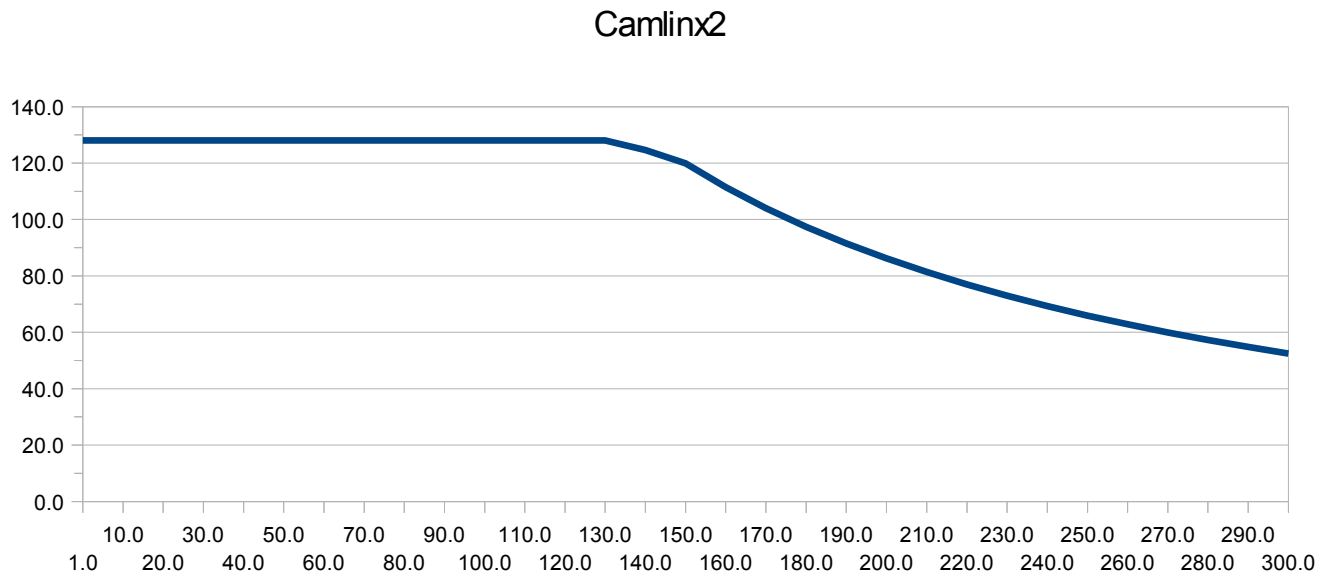
8.1. Introduction

The head and the base units need +12VDC. This can be supplied using;

1. Mains adaptor (TRF-12-PC-FP-F) connected into the +12V DC socket on the rear of the units.
2. Fibre Power Module (FPM-C2LITE) which mounts on the units with a battery plate. The FPM takes 52V from a hybrid cable and generates 12VDC for the units.
3. Camera battery.

8.2. Hybrid fibre/power cable

Power losses down the cable are incurred when using hybrid cable. These losses limit the length of cable that can be used as eventually the voltage level at the head will not be sufficient to power the camera. The following graph shows the power losses typical down a hybrid cable.



Camlinx II : Power (W) vs Distance (m)

System units will operate on any supply voltage from 9.7 Volts to 13.2 Volts DC. A minimum of 12 Volts is recommended to ensure the correct voltage at the camera.

8.3. Camera low battery warnings with 52V power

When operating on the 52Volt power system, the Camlinx 2 head delivers 13.2V to the camera. Camera Battery low warning indication should be set to 12V or lower.

9. Troubleshooting

Most problems with this type of system are related to fibre or power issues.

9.1. Fibre

There are two main types of fibre faults;

continuity faults – due to fibre breaks or connectors not seated correctly.

unexplained losses – dirt in fibre connectors, fibre damage.

Connector losses are low. The maximum for a Neutrik Opticon Connector is 0.5dB. Cable losses are also low, typically 0.2-0.4 dB per km. A typical installation will be under 300M of cabling with 2 or 3 connectors per path. The total loss will then be just over 1dB worst case, usually less.

	Cause	Action
1	Badly seated connectors	Unplug and reconnect fibre connections
2	Dirt	Clean fibre ends
3	Broken fibre	replace fibre

9.2. Power

The Camlinx Power Injector (PI) puts 52V down the hybrid cable and can deliver 125 watts to the camera/head assembly. Attempting to draw more power than this and the system may not work reliably.

If you have problems, first check that the 52V supply is on. Next check the power meter on the Power Injector;

- If no lights are on – the head isn't connected. There is continuity problem, check your cable and connectors.
- If only the bottom light is on – only the head is powered, check your equipment is switched on
- If all lights are on, including the red light at the top, the power supply is overloaded. The user will need to reduce the load on the system or add additional capacity.

An overloaded power supply can be a result of

1) A short circuit – check your cables and connectors
2) Too much equipment being plugged into the head
3) Inrush problems (i.e. surge of power on power on).

If the head is heavily loaded and inrush problems are suspected when the system is powered up, try powering up the PI without the hybrid cable connected. Once the PI is stable, connect the cable and the head should power up correctly.

Specifications

Video - Digital		
Interface Standards	SMPTE 259M (SD), 344M(ED), 292M(HD),	
Data Rate (bps)	270M (SD), 1G5 (HD)	
Impedance Input/Output	75R	
Return Loss	Better than -15dB	
Video – Analogue		
Interface Standards	NTSC, PAL, SECAM	
Ethernet		
Rate	10BaseT/100BaseT	
Connector	RJ45	
Audio / Talkback		
Channels	2 input / 2 output	
Electrical interface	Balanced line	
Connector	XLR-5F	
Adjustable Gain	+20dB	
Frequency Response	±0.1dB (20-20Khz)	
SNR	Min -65dB	Typ -70dB
Fibre Characteristics		
Type	9um	Single Mode
Connector	Neutrik / Lemo (user specified)	
Serial		
RS232 or RS422	User select	
Sync		
Bi-level / Tri-level	Automatic selection (SMPTE 294,296)	
Dimensions L x B x D (mm) (note1)	144 x 183 x 41	
Weight (g) (note1)	700	
Input Voltage Range (12V)	8Vdc-14Vdc	
Power Consumption (Typical)	10W	

Notes:

1 Without Battery Plates.

Ordering Information	
	Camlinx Lite Unit (can act as a head or base) (2 per system) Part Number : **CAML-(M)** M = Battery mounting options AB – Anton Bauer, V – V Lock, P – PagLok, N – none
	FPM – Fibre Power Module Camlinx Lite or Zero. Takes 52VDC from Hybrid cable and provides 12VDC for camera. Provides fibre-optic cable and mains adaptor connectors. 12VDC output for other devices. Part Number : **FPM -(M)-(F)** 4K Version : **FPM4K-(M)-(F)** M = Battery mount options AB – Anton Bauer, V – V Lock, P – PagLok, N – none F = Fibre connector N – Neutrik L3K – Lemo 3K LH - Lemo hermaphroditic R - Rosenberger *
	FAB –Fibre Adaptor Box Connects LC fibre output from the Camlinx unit to Neutrik or Lemo connectors. Enables 52V onto the Hybrid cable from the PSU52V mains adaptor. Part Number : **FAB-(F)** F = Fibre connector N – Neutrik L3K – Lemo 3K LH - Lemo hermaphroditic R - Rosenberger *
	FABW–Fibre Adaptor Box(wall mount) **Part Number : FABW-(F)** **52V mains adaptor** Supplies 52VDC to the FAB for the Hybrid cable.

	Part Number : PSU-52V
	1U Rack Suitable for mounting Camlinx Lite, Zero, FAB and PSU in a 1U rack. Part Number : CAM-1U
	CABLE 52V Connects PSU52V to FAB Part Number : CAB-52V

- Rosenberger connectors are fibre only (no power).

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